

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-37. (cancelled)

38. (currently amended) An apparatus for impedance characterization and ablative treatment of tumors, comprising:

an elongated delivery device including a lumen, the elongated delivery device being maneuverable in tissue; and

an impedance array comprising a plurality of resilient members being positionable in the elongated delivery device in a compacted state and deployable with curvature into tissue from the elongated delivery device in a deployed state and defining a sample volume in the deployed state, at least ~~one~~two of the plurality of resilient members being a sensor member and including a sensor for determining impedance, where each sensor member is operatively connected to a separate impedance energy source, at least some of said resilient members being electrodes which can be coupled to at least one ablating energy source for ablating tissue when electrical energy is supplied to the electrodes from the ablating source;

wherein said impedance array is effective to determine localized impedance.

39. (previously presented) The apparatus according to claim 38, wherein said impedance characterization is vector impedance characterization and at least a portion of the impedance array is configured to determine an impedance vector within a selectable tissue site.

40. (previously presented) The apparatus according to claim 38, wherein said impedance characterization is multi-pathway impedance characterization and at least a portion of the impedance array is configured to sample tissue impedance through a plurality of conductive pathways.

41. (previously presented) The apparatus according to claim 40, wherein the plurality of conductive pathways are configured to be substantially evenly distributed or spaced within the sample volume.

42 (previously presented) The apparatus according to claim 38, wherein the plurality of resilient members includes a first, a second and a third resilient member.

43. (previously presented) The apparatus according to claim 38, wherein the sensor has a resistance gradient.

44. (previously presented) The apparatus according to claim 43, wherein the resistance gradient is along a length of the sensor and configured to compensate for resistive losses or hysteresis along the length of the sensor.

45. (currently amended) The apparatus according to claim 38, wherein at least a portion of the impedance arrays is configured to determine at least one of an intracellular impedance, an interstitial impedance or an intercellular capacitance.

46. (previously presented) The apparatus according to claim 38, wherein the impedance array is configured to determine a locus of impedance within the sample volume.

47. (currently amended) The apparatus according to claim 38, wherein the impedance array is configured to substantially simultaneously determine a first impedance profile at a first tissue site and a second impedance profile at a second tissue site.

48. (previously presented) The apparatus according to claim 47, where, when the impedance characterization is multi-pathway impedance characterization, the first pathway is positioned at a selectable angle relative to the second pathway.

49. (previously presented) The apparatus according to claim 48, wherein the first and second pathway have no common segments.

50. (previously presented) The apparatus according to claim 48, wherein the first and second pathway have a common origin.

51. (previously presented) The apparatus according to claim 50, wherein the first and second pathway have substantially the same pathway, the second pathway being in an opposite direction to the first pathway.

52. (previously presented) The apparatus according to claim 38, wherein the impedance array is configured to detect at least one of an indicator of cell necrosis, a tissue ablation volume, a cell necrosis volume, a tissue thermal volume or a tissue hyperthermic volume.

53. (currently amended) The apparatus according to claim 38, further comprising:

logic resources coupled to at least one of the impedance array or the at least one ablating energy source, and
a processor operatively coupled to the logic resources.

54. (previously presented) The apparatus according to claim 53, wherein at least one of the impedance array or the logic resources is configured to determine or analyze tissue impedance or complex impedance at a frequency distinct from an ablation frequency.

55. (previously presented) The apparatus according to claim 53, wherein the logic resources are configured to identify a tissue condition or differentiate tissue responsive to an impedance signal from the impedance array.

56. (previously presented) The apparatus according to claim 53, wherein the logic resources are configured to analyze an impedance signal at a frequency having an increased tissue condition sensitivity relative to a frequency spectrum.

57. (previously presented) The apparatus according to claim 56, wherein the logic resources are configured to distinguish between normal and abnormal tissue, the abnormal tissue including at least one of abnormally mutated tissue, abnormally dividing tissue, cancerous tissue, metastatic tissue or hypoxic tissue.

58. (previously presented) The apparatus according to claim 53, wherein the logic resources are configured to distinguish between necrosed and non-necrosed tissue.

59. (previously presented) The apparatus according to claim 53, wherein the logic resources are configured to identify one of an inflection point, an asymptote, a minimum or a maximum of an impedance signal.

60. (previously presented) The apparatus according to claim 59, wherein the logic resources are configured to identify at least one of an endpoint, an amount of tissue injury or a tissue type utilizing at least one of the inflection point the asymptote, the minimum or the maximum of the impedance signal.

61. (previously presented) The apparatus according to claim 38, wherein the logic resources are configured to identify an endpoint for an ablation procedure responsive to an impedance signal from the impedance array.

62. (previously presented) The apparatus according to claim 38, wherein the impedance signal includes at least one of an intracellular impedance, an interstitial impedance an intercellular capacitance or a complex impedance, and wherein the logic resources are configured to identify a tissue condition utilizing at least one of an

impedance ratio including at least one of interstitial to intercellular impedance, real to imaginary impedance or impedance to capacitance.

63. (previously presented) The apparatus according to claim 55, wherein the impedance signal is a complex impedance and the logic resources are configured to identify a tissue condition of the sample volume utilizing real and imaginary components of the complex impedance signal.

64. (previously presented) The apparatus according to claim 53, wherein the logic resources are configured to compare the impedance of the first tissue site to an impedance of the second tissue site.

65. (previously presented) The apparatus according to claim 39, wherein the impedance array is configured to detect real and imaginary components of the impedance vector or magnitude and phase angle of the impedance vector.

66. (previously presented) The apparatus according to claim 38, further comprising:

an advancement member coupled to the impedance array, the advancement member including an actuable portion, the advancement member configured to control deployment of at least a portion of the impedance array.

67. (previously presented) The apparatus according to claim 38, wherein at least a portion of the impedance array is configured to sample a complex tissue impedance through a plurality of conductive pathways and detect or measure an indicator of at least one of tumorous tissue or cell necrosis.

68. (previously presented) The apparatus according to claim 38, further comprising:

a multiplexing device operatively coupled to at least some of said plurality of resilient members for multiplexing electrical energy between said plurality of resilient members.

69. (currently amended) The apparatus according to claim 38, wherein the at least one ablating energy source is selected from the group consisting of a RF source, a microwave source, and a laser source.

70. (previously presented) The apparatus according to claim 38, wherein said apparatus operates in a mono-polar mode, said apparatus further comprising:
a ground electrode.

71. (previously presented) The apparatus according to claim 69, wherein said apparatus is switched between a bipolar mode and the mono-polar mode.